Listing of Claims

1. (Currently Amended) A method of forming a dielectric layer of a semiconductor device, comprising the steps of:

growing an oxynitride layer of a semiconductor device, wherein the oxynitride layer is grown to a thickness in a range of about 12 to about 24 angstroms; and

annealing the oxynitride layer at a temperature of about 400°C for about 20 minutes.

2. (Original) The method of claim 1, wherein the annealing is performed in a nitrogen ambient or a nitrogen ambient including an oxygen concentration of less than about 1 part per billion.

3. (Canceled)

4. (Original) The method of claim 1, further comprising the step of:

capping the annealed oxynitride layer with a gate, wherein the gate is silicon, polysilicon, germanium, silicon-germanium, any other semiconductor material, or a metal.

5. (Original) The method of claim 4, wherein the metal is aluminum.

6. (Original) The method of claim 4, wherein the growing of the oxynitride layer is carried out by using a plasma nitridation process.

7. (Original) A Field Effect Transistor having a gate dielectric, wherein the gate dielectric is formed using the method of claim 1.

8. (Original) A capacitor having a dielectric layer, wherein the dielectric layer is formed using the method of claim 1.

9. (Original) A MIM capacitor having a dielectric layer, wherein the dielectric layer is formed using the method of claim 1.

10. (Original) A method of forming a dielectric layer within a semiconductor device, comprising the steps of:

growing an oxynitride layer on a semiconductor device;

annealing the oxynitride layer at a temperature of about 400°C for about 20 minutes, wherein the annealing is performed in a nitrogen ambient including an oxygen concentration of less than about 1 part per billion; and

capping the annealed oxynitride layer with a gate.

11. (Original) The method of claim 10, wherein the gate is silicon, polysilicon, germanium, silicon-germanium, any other semiconductor material, or a metal.

12. (Original) The method of claim, 11 wherein the metal is aluminum.

13. (Original) The method of claim 10, wherein the growing of the oxynitride layer is carried out by using a plasma nitridation process.

14. (Original) The method of claim 10, wherein the annealing further comprises preheating the semiconductor substrate to a temperature of about 400°C.

15. (Original) A Field Effect Transistor having a gate dielectric, wherein the gate dielectric is formed using the method of claim 10.

16. (Original) A method for forming a dielectric layer on a semiconductor device, comprising the steps of:

growing an oxynitride layer on a semiconductor device in a processing chamber;

preheating the semiconductor device to a temperature of about 400 0 C;

annealing the oxynitride layer for about 20 minutes at a temperature of about 400°C; and

cooling the semiconductor device with the annealed oxynitride layer.

17. (Original) The method of claim 16, wherein the preheating step is performed for about 4 minutes.

18. (Original) The method of claim 16, wherein the cooling step is performed for about 4 to 10 minutes.

19. (Original) The method of claim 16, wherein the cooling step is performed until the semiconductor device is at a temperature in a range of about 25 to about 300°C.

20. (Original) The method of claim 16, wherein the annealing is performed in a nitrogen ambient or a nitrogen ambient including an oxygen concentration of about 1 to about 10 parts per billion.

21. (Original) The method of claim 16, wherein the oxynitride layer is grown to a thickness in a range of about 12 to about 24 angstroms.

22. (Original) The method of claim 16, further comprising the step of:

capping the annealed oxynitride layer with a gate.

23. (Original) The method of claim 22, wherein the gate is silicon, polysilicon, germanium, silicon-germanium, any other semiconductor material, or a metal.

24. (Original) The method of claim 23, wherein the metal is aluminum.

25. (Original) The method of claim 16, wherein the growing of the oxynitride layer is carried out by using a plasma nitridation process.

26. (Original) A Field Effect Transistor having a gate dielectric layer, wherein the gate dielectric layer is formed using the method of claim 16.

27. (Original) A capacitor having a dielectric layer, wherein the dielectric layer is formed using the method of claim 16.

28. (Original) A MIM capacitor having a dielectric layer, wherein the dielectric layer is formed using the method of claim 16.

29. (Currently Amended) A method of forming a dielectric layer of a semiconductor device, comprising the steps of:

growing an oxynitride layer of a semiconductor device;

depositing a gate electrode layer on the oxynitride layer; and

annealing the oxynitride layer and gate electrode layer at a temperature of about 400°C for about 20 minutes, wherein the annealing is performed in a nitrogen ambient including an oxygen concentration of about 1 to about 10 parts per billion.

30. (Canceled)

31. (Original) The method of claim 29, wherein the oxynitride layer is grown to a thickness in a range of about 12 to about 24 angstroms.

32. (Original) The method of claim 29, wherein the growing of the oxynitride layer is carried out by using a plasma nitridation process.

33. (Currently Amended) ~~The method of claim 29~~ A method of forming a dielectric layer of a semiconductor device, comprising the steps of:

growing an oxynitride layer of a semiconductor device;

depositing a gate electrode layer on the oxynitride layer; and

annealing the oxynitride layer and gate electrode layer at a temperature of about 400°C for about 20 minutes, wherein the annealing is performed in a nitrogen ambient including an oxygen concentration of less than about 1 part per billion.

34. (Original) The method of claim 29, wherein the gate electrode layer is silicon, polysilicon, germanium, silicon-germanium, any other semiconductor material, or a metal.